

ON AN IMPROVED METHOD OF CULTIVATING MICRO-ORGANISMS ON POTATOES.

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(WITH TWO FIGURES IN WOOD-CUT).

In the first number of the first volume of the "Centralblatt für Bacteriologie und Parasitenkunde," edited by Leuckart, Loeffler, and Uhlworm, Jena (Gustav Fischer), 1887, pp. 26-27, Dr. E. Esmarch writes on the "Preparation of the potato as a culture-medium for micro-organisms." He calls attention to the universally recognised value of the boiled potato as a culture-soil for most vegetable micro-organisms, for the identification of some of which, especially the bacillus of typhoid fever (Eberth-Gaffky), it is, so far as known, an indispensable and the only reliable medium.

The hitherto customary processes of preparing potatoes for this purpose are, as Esmarch rightly states, far from being satisfactory. He, therefore, proposes the following method. One or more small glass-capsules, of the appearance of the usual damp chambers for cultivating fungi, are sterilised by dry heat. A potato is then peeled by means of a common kitchen-knife, and, after having been rinsed under the water-tap, divided by the same knife into slices about 1 cm. thick, which are next adapted to the diameter of the glass-dishes and placed in the same. These potato-slices prepared in the above manner, are then boiled by steam in the steam-steriliser for from $\frac{3}{4}$ to 1 hour, and are shortly afterwards ready for use.

This process in the preparation of potatoes, and their storage in small glass dishes with over-lapping lids is undoubtedly far superior to the old mode of preparation and preservation.

Yet there remain still some inconveniences which relate to the use of such reservoirs for the slices of potato, and which would seem to leave an improvement in this direction to be desired.

I would now recommend a method that recently yielded quite satisfactory results, when I was, some time ago, on a short stay in the Coast Hospital at Little Bay, near Sydney, where I was principally engaged in making a series of cultivations from dejections in cases of typhoid fever, and from organs of persons who died of this disease.

I take a number of shallow but spacious test-tubes, of about 10·5 cm. height by 2·5 cm. diameter, which, having been supplied with a sufficiently deep cotton-wool stopper (figs. 1, 2), are then sterilised in the usual manner. The preparation of the potatoes is the same as in Esmarch's process. The potato-slices, cut out of medium-sized, oval-shaped, perfectly healthy potatoes, and about 1 cm. thick (*p* in fig. 1, front view; in fig 2, side view; both natural size), are now placed, by aid of a clean pair of forceps, in the above described test-tubes, to the width of which they are made to fit. It is only advantageous if the slices press loosely by one or some points of their margin on the inner walls of the glass-tubes, and thus, resting either at the bottom of these or a little separate from it, they are sufficiently fixed inside those glass-vessels. Then comes the steam-steriliser, in which they remain for about 1 hour at 212° F. (100° C.); the potatoes are hereafter thoroughly boiled and sterile.

It is evident that in this way we arrive at a culture-medium which, as regards simplicity in its manipulation, convenience in the process of inoculating, and safety in keeping the desired pure-culture uncontaminated during the course of examination and observation, shares the same advantages with the nutrient gelatinous substances and coagulated blood-serum, or with any culture-soil kept in glass-tubes. A desiccation of the surfaces of the potato-slices will not so soon make its appearance; as after boiling in the steam-steriliser there is at the bottom of the culture-tubes a quantity of fluid large enough to keep the contents

of these, at an incubation of from 20° - 25° C. (68° - 77° F.), sufficiently moist for a considerable length of time. At higher

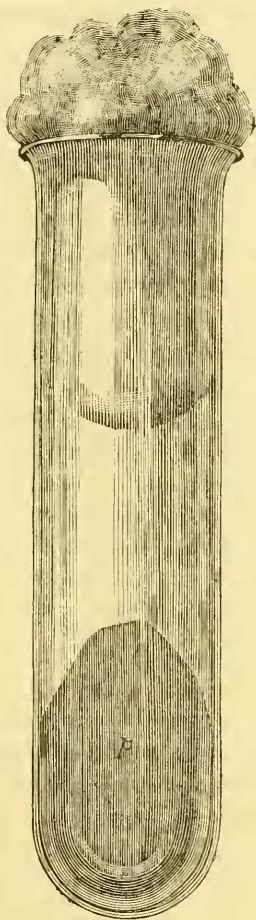


FIG. 1.

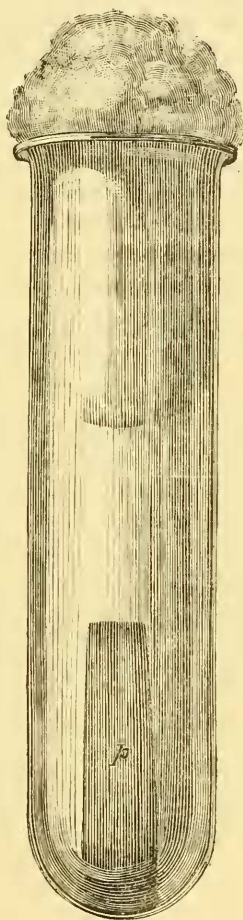


FIG. 2.

temperatures up to blood-heat the development of micro-organisms capable of cultivation of boiled potato is so much accelerated that

also in this case any apprehensions of the danger of desiccation must disappear. However, it is advisable, whenever we have a larger supply of such prepared potatoes, to put an indiarubber-cap on the opening of the tubes over the cotton-wool stopper, or to tie some indiarubber-tissue round it.

One thing still needs mention, namely, that we are able to avail ourselves of both the surfaces of the potato-slices since these are mounted so as to occupy a middle position in the *lumen* of the test-tubes (p. 189, fig. 2). We can inoculate both these surfaces either with one and the same microbe, taken from one and the same colony or culture, or we can also easily cultivate on the one side one organism, on the other a different one.

The latter mode may sometimes prove to be a matter of some convenience; for instance: in cultivations on plates of gelatine after Koch, or in test-tubes with gelatine after Esmarch, made from stools of typhoid fever patients, there appear after some time different kinds of non-liquefying colonies which grow nearly at the same rate, exhibit under high powers of the microscope similar forms, and which it must be desirable to cultivate on boiled potatoes in order to find out which ones appertain to the bacillus of typhoid fever. In this case, then, we might transfer to the one side of the potato-discs a minute quantity of one colony, to the other side, while still holding the glass tube in our left hand, a little of another, somewhat different-looking colony.

In conclusion I may add that test-tubes of the above description seem also well adapted for the cultivation on and in gelatine after Esmarch's method (*Zeitsch. f. Hygiene, herausgeg. von Koch und Flügge*, Band I., Heft 2, Leipzig, 1886, pp. 293-301).